

REMARKS

The Office action of October 19, 2004 has been received and its contents carefully noted.

Claims 1-14 are pending in the application. Claims 1, 5, and 10-14 have been amended. The rejection of claims 12-14 in accordance with 35 U.S.C. § 112 has been noted. While not agreeing with this rejection, claims 12-14 have been amended for further clarity.

Claims 5 and 10 stand rejected under 35 U.S.C. § 102(e) as being unpatentable over Ooi et al. ("Ooi") (U.S. Patent No. 6,362,913). Claims 1, 4 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants Admitted Prior Art (AAPA). Claims 1, 4, 8 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ooi. Claims 2 and 6 stand rejected under § 103(a) as being unpatentable over Ooi in view of Miyamoto et al. ("Miyamoto") (U.S. Patent No. 6,559,996). Claims 3 and 7 stand rejected under § 103(a) as being unpatentable over Ooi in view of Jabr (U.S. Patent No. 6,229,632). Claims 11-14 stand rejected under § 103(a) as being unpatentable over Ooi in view of Ishihara (U.S. Patent No. 5,557,648). Applicants respectfully traverse these rejections, and request allowance thereof for the following reasons.

Substance of the Interview

Applicants greatly appreciate the courtesy extended by the Examiner and his Supervisor during an interview with the Applicants' Representative on November 3, 2004. In response to the Examiner maintaining the current claim rejections, the Representative clarified to the Examiner that the recited features of the claimed bias voltage control unit were not disclosed by the cited reference, Ooi. The Examiner agreed that Ooi did not disclose these features, and further agreed to enter an after-final response which clarified the omission of these features from Ooi. And the Examiner agreed to withdraw the finality of the last Office Action upon filing of this response. Representative agreed to consider filing a response which emphasized these distinguishing features in the Remarks.

The Present Claims are Patentable Over the Cited References

Claims 5 and 10 are not anticipated by Ooi

Claims 5 and 10 are rejected under § 102(b) in view of Ooi. Ooi fails to disclose the features recited in these claims such as an optical transmission apparatus including a bias voltage control unit which applies a bias voltage added with an error signal of the bias voltage to an optical modulator.

Ooi fails to disclose these patentably distinct features. In contrast, Ooi discloses generating a bias voltage using a bias supply circuit 58 (essentially an

inductor L) that is not equivalent to the bias voltage control unit as recited. (see FIGs. 1, 7, 25; col. 15, lines 1-8, 63-67; col. 16, lines 1-10). In contrast to the recited feature, the bias supply circuit 58 disclosed by Ooi is simply an inductor circuit which receives the input low-frequency signal from the low-pass filter 57d to generate the output bias voltage Vb1 as clearly illustrated by the dotted arrow line in FIG. 7 (see Vb1).

Specifically, Ooi states that "...the bias supply circuit 58, which is constituted by a bias tee 58a...the bias tee 58a has a coil L, which is for supply the signal electrode 52a of the optical modulator with the bias voltage Vb1..." (see FIG. 7 col. 15, lines 1-8). As stated in the Action, Ooi does disclose inputting a high-frequency signal from the optical modulator 52, but there is completely no mention of adding this input high-frequency signal to the error signal input from the low-pass filter 57d to produce the output bias voltage Vb1 to the modulator 52. As clearly illustrated in FIG. 7 (see dotted arrow line – Vb1) and supported by the Ooi disclosure, the output bias voltage Vb1 is solely generated by the input low-frequency signal from the low-pass filter 57d, as this low-frequency signal input goes through inductor L to supply the bias voltage Vb1 to optical modulator 52. Again, there is completely no mention of adding this bias voltage produced by inductor L with the input high-frequency signal from the modulator which strongly distinguishes Ooi from the recited feature.

The disclosure of Ooi does not anticipate or make obvious the recited features of generating an error signal of a bias voltage for maximizing a value of a frequency component two times that of the driving signal and a bias voltage control unit which applies a bias voltage added with an error signal of the bias voltage to an optical modulator.

Claim 8 is not made obvious by Ooi

Claim 8 is rejected under § 103(a) in view of Ooi. Ooi fails to disclose the features recited in these claims such as an optical transmission apparatus including a bias voltage control unit which applies a bias voltage added with an error signal of the bias voltage to an optical modulator.

As contended above, Ooi discloses an extractor for a low-frequency component to be fed to a bias supply circuit comprising an inductor to generate a bias voltage. This disclosure of Ooi does not make the recited features obvious.

Claims 1 and 9 are not made obvious by Ooi or AAPA

Claims 1 and 9 are rejected under § 103(a) in view of AAPA and under § 103(a) in view of Ooi . AAPA and Ooi individually fail to disclose the features recited in these claims.

In embodiments of the present invention, an optical signal having a frequency ($2f_c$) is generated by the Mach-Zehnder optical modulator for the driving signal having a frequency (f_c) as disclosed, for example, page 16 line 24 to page 17, line 3 in applicants' specification. The frequency f_c component or frequency $2f_c$ component is used for carrying out the bias voltage control as described at page 24 lines 10 to 20 in the specification.

In contrast, in AAPA, an optical signal having a frequency (f_c) is generated by the Mach-Zehnder optical modulator for the driving signal having a frequency (f_c). See page 7, line 1 to page 9, line 4. Further, a low frequency signal output from the dither signal generator is used for carrying out the bias voltage control. See page 5, line 3 to 20.

Also, Ooi discloses, contrary to the present invention, generating an optical signal having a frequency ($2f_c$) for the driving signal having a frequency (f_c). However, low frequency signal (dither signal) is used for carrying out the bias voltage control. See Figs. 7, 9, 11, 13, 15, 19, 21, 23 and 25.

Ooi fails to disclose the unique feature of carrying out bias control using the frequency (f_c) component or frequency ($2f_c$) component included in the optical signal. Therefore, Ooi requires a low frequency oscillator and a low frequency superimposing unit, which makes the circuit more complex than the present invention.

Moreover, Ooi fails to teach or suggest generating an error signal of a bias voltage for minimizing a value of a frequency component of the driving signal, as recited in claims 1 and 9.

Claims 3 and 7 are not made obvious by Ooi and Jabr

Claims 3 and 7 are rejected under § 103(a) in view of Ooi and Jabr. Ooi and Jabr, either alone or in combination, fail to disclose the features recited in these claims such as an optical transmission apparatus including a bias voltage control unit which applies a bias voltage added with an error signal of the bias voltage to an optical modulator.

As contended above, Ooi discloses an extractor for a low-frequency component to be fed to a bias supply circuit comprising an inductor to generate a bias voltage. This disclosure of Ooi does not make the recited features obvious. Further, Jabr discloses a method for differential wavelength modulation in an optical transmission system which does not make the recited features obvious.

Claims 11-14 are not made obvious by Ooi and Ishihara

Claims 11-14 are rejected under § 103(a) in view of Ooi and Ishihara. Ooi and Ishihara, either alone or in combination, fail to disclose the features recited in these claims such as a method of making an optical transmission apparatus

including providing a controller to generate a bias voltage, said bias voltage being generated from combining an error signal with a predetermined bias voltage;

As contended above, Ooi discloses an extractor for a low-frequency component to be fed to a bias supply circuit comprising an inductor to generate a bias voltage. This disclosure of Ooi does not make the recited features obvious. Further, Ishihara discloses a phase-lock loop method using a sample-and-hold switch circuit which does not make the recited features obvious.

Conclusion

In view of the amendments and remarks submitted above, it is respectfully submitted that all of the remaining claims are allowable and a Notice of Allowance is earnestly solicited.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayments to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Appln. No. 09/892,918

The Examiner is invited to contact the undersigned at (703) 205-8000 to discuss the application.

Respectfully submitted,

BIRCH, STEWART, KOLASCH, & BIRCH, LLP

By: 

Michael K. Mutter

Reg.#29,680

MKM/CJB:cb
2611-0151P

P.O. Box 747
Falls Church, VA 22040-0747
Phone: (703) 205-8000